COPY

WAR DEPARTMENT

10.

OFFICE OF THE CHIEF SIGNAL OFFICER

WASHINGTON

OCSigO 070

May 27, 1936

SUBJECT: Invention

TO: Director, Signal Corps Laboratories,
Fort Monmouth, N. J.

1. Your comments are desired as to the feasibility and military value of the invention of Captain H. G. Miller and Mr. W. F. Friedman, described herein.

2. Upon the return of this communication, it may be forwarded to the Patent Section for action or comment.

By Order of the Chief Signal Officer:

Walter C. Ellis,
Major, Signal Corps.

Incls.
2 pages of description.

FM(SCL) 070
(5/27/36) 1st Ind. FTG:B

SIGNAL CORPS LABORATORIES, FORT MONMOUTH, OCEANPORT, N. J. June 5, 1936.
TO: Chief Signal Officer, War Department, Washington, D. C.

1. The disclosure of Captain H. G. Miller and Mr. W. F. Friedman does not include sufficient details upon which a decision as regards feasibility and military value may be based. This is particularly true in the absence of any experimental data. As a strictly theoretical consideration and assuming all elements are held in phase, it is conceivable that operation as described may result.

2. In the final analysis the practicability of the system depends upon the exactness of phase and of magnitude of frequency components, which are dependent upon the magnetic positioning and response of the impressing and cancelling magnets, the characteristics of the various electrical circuits, and the respective rates of progression of the steel tapes. As shown, the progressive rate of the tape is also dependent upon a varying drum diameter assuming uniform shaft revolution. In other words the description is confined to the germ of the idea and on that basis none of the practical considerations is discussed.

L. L. CLAYTON
Major, Signal Corps,
Director

Incls. withdrawn

May 25, 1936

MEMORANDUM FOR: Research and Development Division
(THRU: War Plans & Training Division)

1. There are forwarded herewith two sketches and brief explanation of a "System and Means for Enciphering and Deciphering Magnetically-Recorded Signals", which is the joint invention of the undersigned.

2. Some doubt has been expressed with regard to the validity of the basic assumptions upon which the ideas embodied in the system now rest. It is understood that Mr. W. D. Hershberger of the Signal Corps Laboratories at Fort Monmouth has made rather extensive investigations in the field in which this system falls and that he is expected to be in Washington in the near future. A conference with him on this subject would be most desirable and it is requested that this be arranged for, if practicable.

3. If the system turns out to be theoretically sound in principle, it is desired that patent application be filed thereon.

Harrod G. Miller,
Captain, Signal Corps.

William F. Friedman.

Attached:
Two sketches.

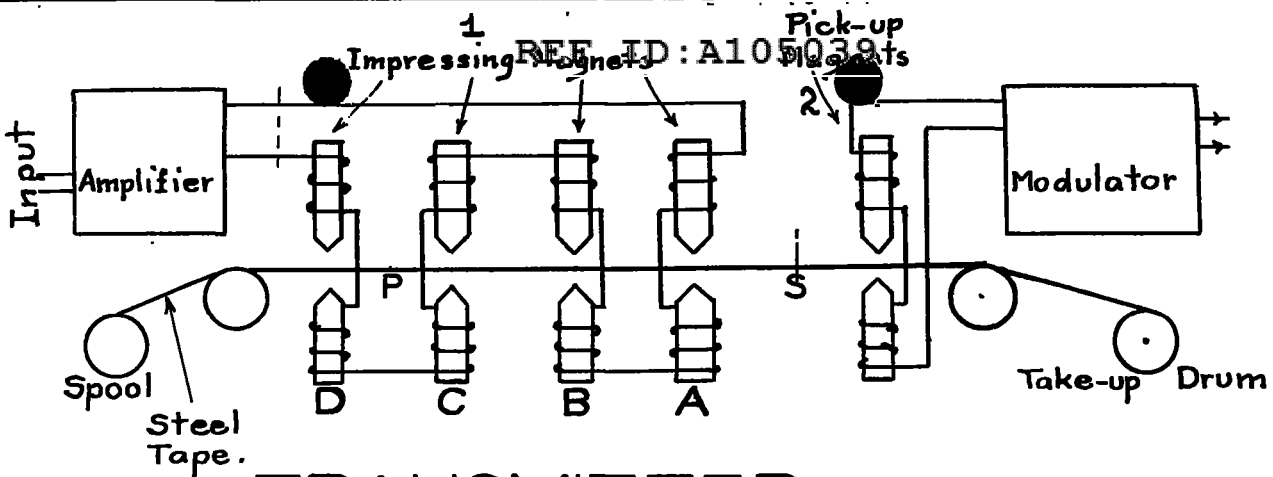
1st Ind. 8

OCSigO, War Plans & Training Division, May 25, 1936 - To: Research & Development Division, OCSigO.

Forwarded.

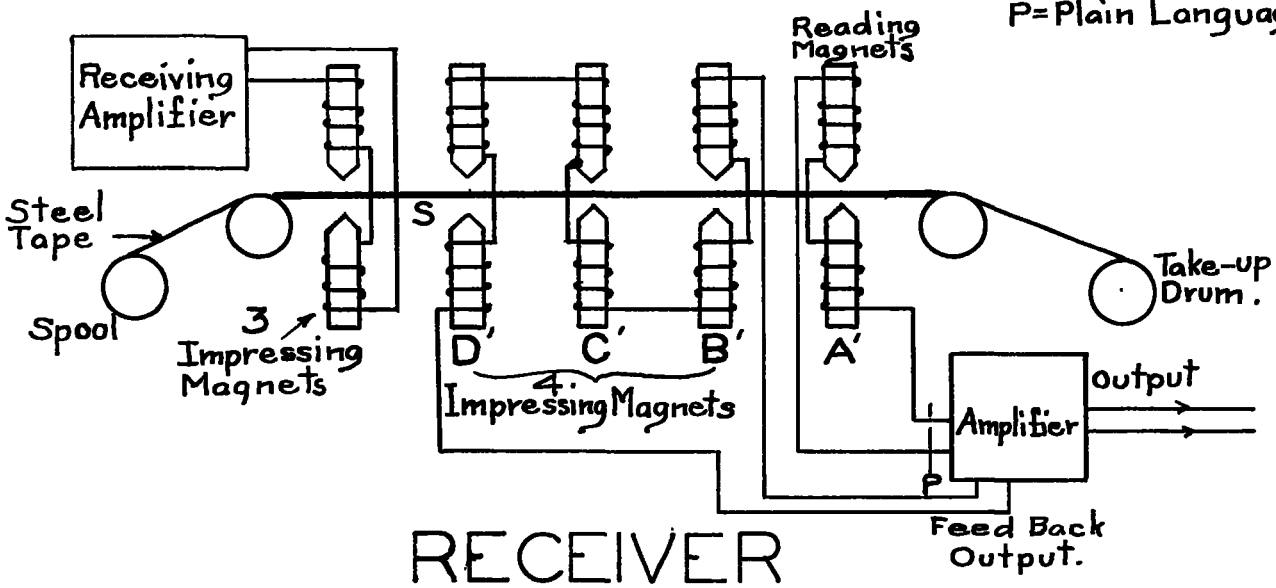
W. S. Rumbough,
Major, Signal Corps.

Attached:
Two sketches.



TRANSMITTER

S=Secret Language.
P=Plain Language.



RECEIVER

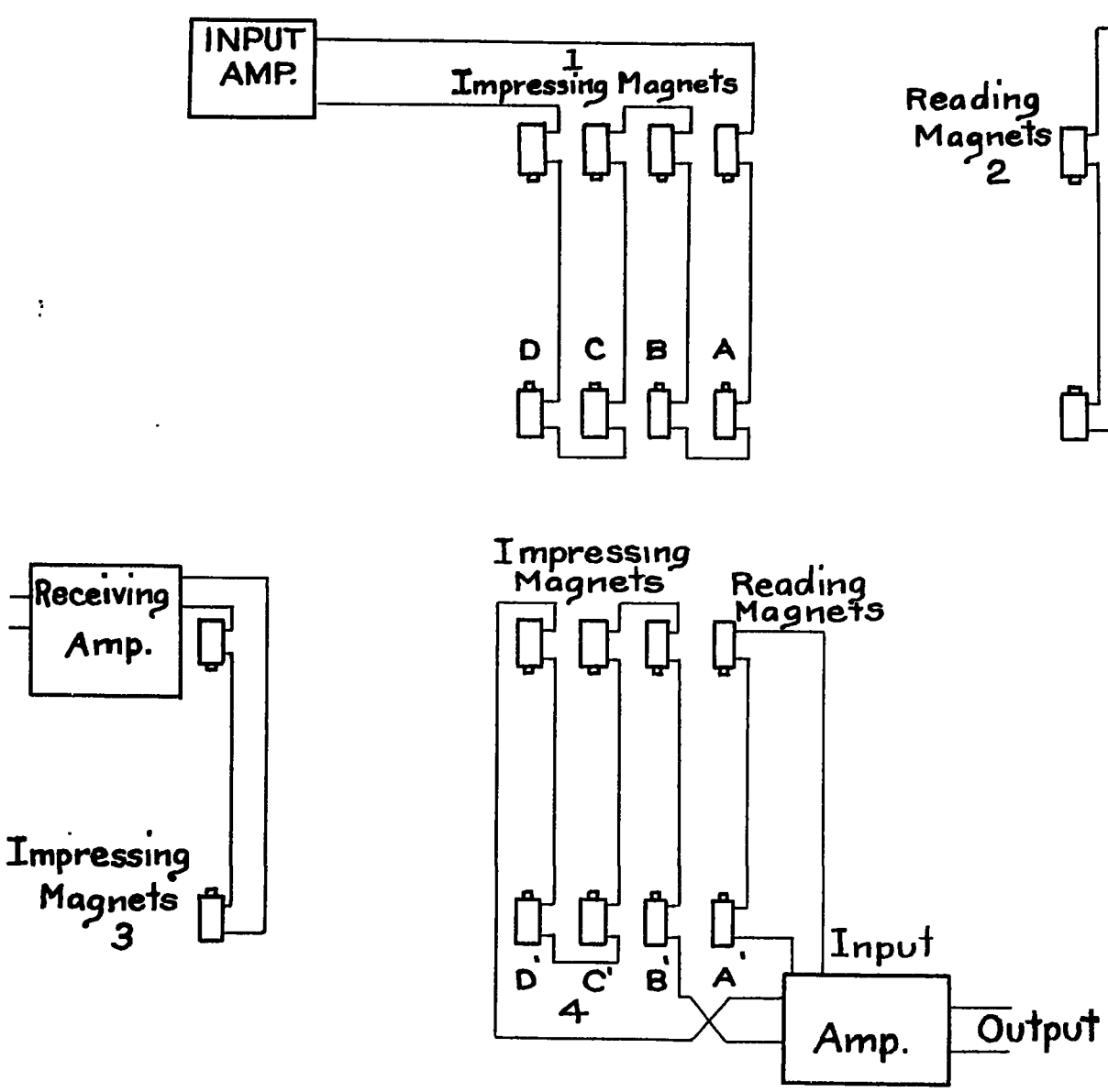
SYSTEM AND MEANS FOR ENCIPHERING AND DECIPHERING MAGNETICALLY-RECORDED SIGNALS.

Transmitting end: Electrical oscillations corresponding to input signals are recorded magnetically on a moving metal tape, the tape passing successively between the paired impressing magnets ABCD which are in series. Thus, the final or resultant magnetization of the tape corresponds to a sequence of blocks of algebraically superimposed frequencies representable by the sequence A, AB, ABC, ABCD, BCDE, CDEF, ..., the "A" block coming at the head of the train. When the record is passed between the paired reading magnets at 2, signals corresponding to the resultant magnetization are emitted or transmitted. These are enciphered signals.

Receiving end: The impressing magnets, 3, record the received signals magnetically on a metal tape moving at approximately the same rate of speed as at the transmitting end. The record passes between the paired magnets at 4. The magnet A' is a reading magnet and its output is led to the amplifier, where part of the energy is translated into final output, and part is fed back into the impressing magnets B', C', and D'. The electrical circuits are such as to cause the feed-back alternations impressed on B', C' and D' to be of opposite phase from the alternations fed by A' into the amplifier. This results in neutralizing and removing the homologous magnetic equivalents on the tape, leaving only the original plain language on the tape when it reaches magnet A'. The signals at this point are deciphered signals. The cryptographic principle consists in micrometrically varying the distances between magnets A, B, C, and D and making homologous micrometric adjustments of the distances between magnets A', B', C' and D', the variations being determined by prearranged cipher keys.

Invented May 12, 1936 by
William F. Friedman
Frank B. Wallace, Capt., Sig.

Disclosure made by Inventors
May 12, 1936 Jean Hilaire Voorhees
Chicago, Ill.
May 12, 1936 Richard D. Lawler
Office Ch. Sig. Officer
May 12, 1936 Larry M. Jackson
Office Ch. Sig. Officer



Schematic Representation of Operation of "System and Means for enciphering and Deciphering Magnetically Recorded Signals"; Invented May 12, 1936 by:

William F. Friedman

Harold S. Miller
Capt., Sig. C.

Disclosed to me
may 23, 1936
Solomon Kullback
5311 8th St N.W., Wash D.C.

Disclosed to me May 23, 1936
Abraham Sinkov
518 H St NW Wash. D.C.

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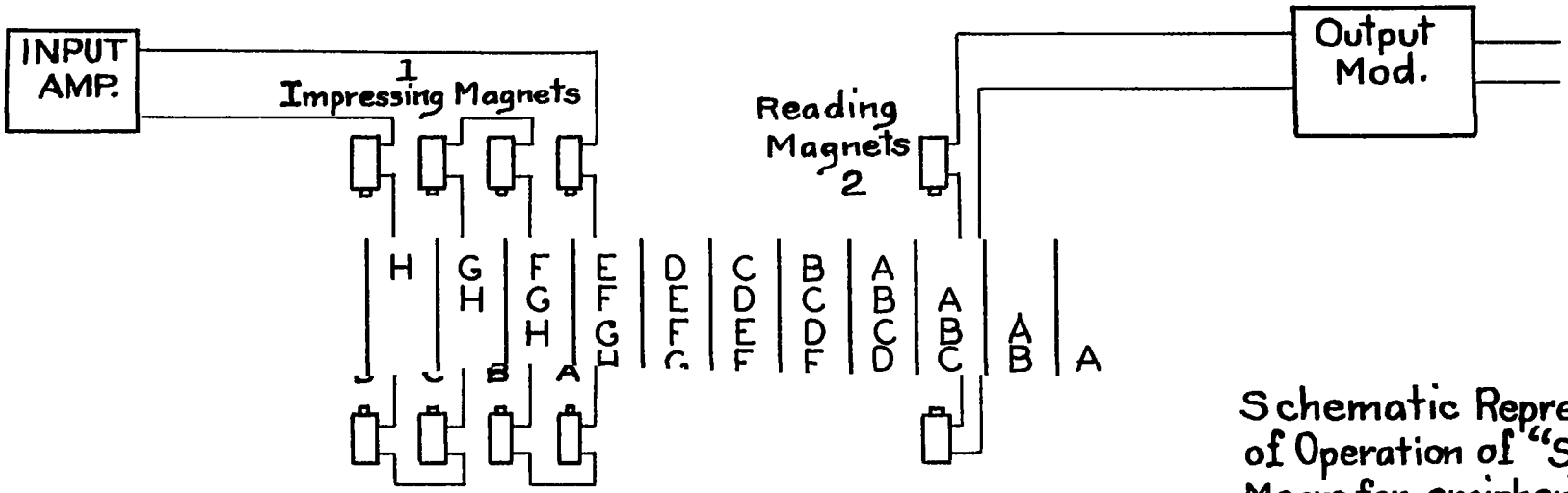

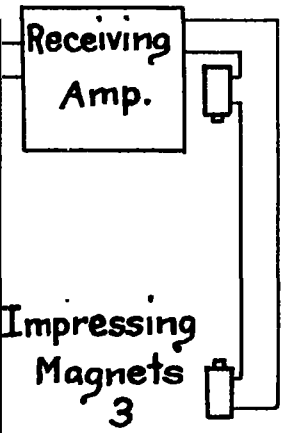

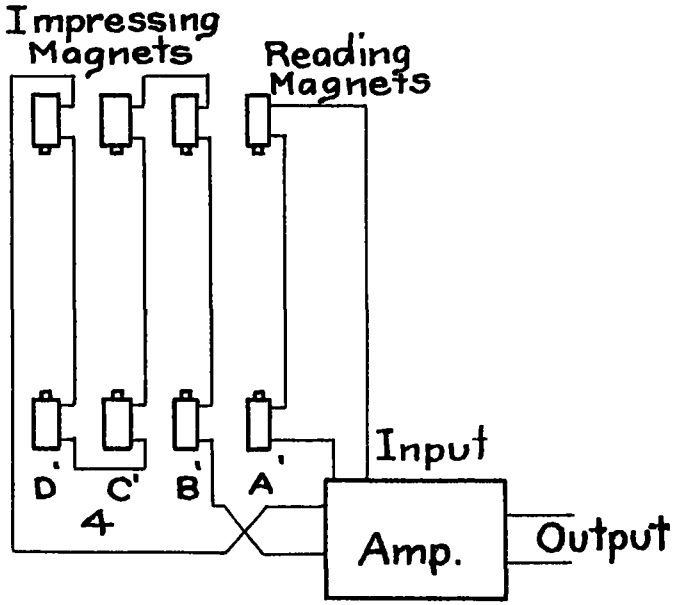

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